

or cylinder of brass to swing in the liquid at various depths. The whole can be raised or lowered with a micrometer screw, and it is thrown into slight oscillation by means of a magnet. A rectangular glass vessel is used for the liquid. The author finds that with distilled water the resistance increases suddenly and to a quite considerable extent whenever the upper edge of the plate comes into the free surface, and he does not doubt this is due to increased friction in the surface layer. The increase of resistance from the last previous position of the plate was 60·9 per cent., and with four aqueous salt solutions there was also an increase, varying between 75·1 to 54·1 per cent. Precautions adopted to prevent the presence of foreign particles on the surface (filtration, covering with moist filter-paper, &c.) had hardly any influence on the values. Long-standing of the liquid increased the surface-resistance, and stirring then diminished it; still it was always considerable at first. With M. Plateau, Herr Oberbeck found a decrease of resistance at the surface in some liquids; this was comparatively small (alcohol 11·9 per cent., oil of turpentine 12·6, sulphide of carbon 26·3, &c.). A small addition of alcohol to water lessens its surface-resistance property in a marked degree, and with further addition the mixture behaves like pure alcohol.

IN a paper on dew and fog (*Zeits. für Meteor.* Bd. xv. p. 381) Herr Dines, from observations of the former with watch-glasses exposed on different substances at night, estimates the annual dew formation to be about 35·5 mm. (on grass, 26 mm.); at the best 38 mm. The average nightly dew (in 198 observations) was hardly 0·1 mm.; in a few cases 0·3 mm.; average on grass 0·07 mm. Morning fog along a river course arises when the water is warmer than the air over it. The evaporation goes on more quickly than the vapour can be carried away; hence the latter is condensed and spreads as fog (similarly with fogs over the Gulf Stream). The evening fog on moist low-lying meadows is due to the fact that the grass surface cooled by radiation cools the lowest air-layers, so causing condensation of the aqueous vapour. The fine drops of dew, Herr Dines estimates, are about 0·001 mm. in diameter; while the finest rain-drops have a diameter of 0·3 to 0·33 mm. The particles of fog vary in diameter from 0·016 to 0·127 mm.

THE colour-changes presented in the microscope by various substances (chiefly mineral) of uneven surface, when immersed successively in liquids of different refracting power, have been made by Herr Maschke (*Wied. Ann.* No. 12) the basis of a method of distinguishing substances. Such changes may be had, e.g. with small glass particles, observed in water, in oil of almonds, and in mixtures of the latter with oil of cassia. The dark and the bright parts of the image show different series of colours. That the effects are simply due to prismatic action of the object appears from the fact that they may be got without the microscope, by looking e.g. through a tube at a piece of rock-crystal in water, &c. For mineral objects Herr Maschke used five liquids; amylic alcohol and glycerine, besides the three just named. By various mixtures of these a series of liquids is obtained, giving any desired index of refraction from 1·333 to 1·606. (Coloration begins when the refraction of the liquid is near that of the object; when the former greatly exceeds the latter a certain stability of colour appears.) The method is not applicable to bodies opaque in the microscope, or having too strong colours of their own; nor yet to bodies having a greater index of refraction than oil of cassia. It may, too, prove difficult sometimes to find a liquid sufficiently indifferent to the object. Herr Maschke indicates how the refractive indices of substances may be compared by his method, and (a more difficult task) numerically determined. He also gives a number of his own determinations.

AN interesting study, by Herr Holtz, of the electric discharge in insulating liquids appears in *Wiedemann's Annalen*, No. 12. Among other results the length of spark is found hardly at all dependent on quantity or on retardation of the discharge. Naturally it differs in different liquids, but only in one liquid (sulphuric ether) did it increase with velocity of rotation of the disk (this appears to be due rather to the mode of preparation than to the nature of the liquid). As in air, with dissimilar electrodes, the spark-length is conditioned by the polarity of the electrodes. The thickness, sound, and luminous force of the spark depend chiefly on the electric quantity and the retardation. The spark is thinner than in air, but brighter (brightest in sulphide of carbon, least bright in olive-oil and ether). It is more crooked than in air. Throughout its length it shows innumer-

able very small dark spaces. With large striking distance it appears within a largely-branching brush. (The appearances of the brush discharge, got best in petroleum, are also described.)

FROM data obtained in various parts of Germany, Austria, and Switzerland (*Wied. Ann.* No. 12), Herr Holtz finds a well-marked increase in risk from lightning in these parts since 1854, while no such increase appears in the number of thunderstorms. Hence he infers the causes to be telluric, and he suggests as probable causes the clearing of forests and increase of railways (attracting storms more to towns and villages); further, the increased use of metal in buildings.

PROF. BOMBINI has lately communicated to the Bologna Academy an interesting paper on spherohedry in crystallisation (*Riv. Sci. Ind.* No. 21), by which he means any known manner of production of a fibrous-radiate structure. From a survey of facts he concludes that the great phenomenon of crystallisation comprises two different orders of attractive energy. In the first there is simple centralised attraction, with concurrence of the elements attracted to a common centre. In the second there is attraction with directive polarity according to certain axes of symmetry, and concurrence of the attracted elements towards nodal points in a certain reticular system. Between these two kinds of crystallogenic action there are many gradations, or rather syntheses, superpositions. Further, the correlations between the sphericity characteristic of the liquid state; the spherohedry of globosity with radiated structure; the isometry of radiate pseudocubical groups; leading from the *amorphous* state of liquids to the absolutely reticular state of the true crystals (isotropic, orthorhombic, and clinohedric) confirm the cubicity of the first system, and at the same time point to some further significant terms in the progressive series of the physical states of inorganic matter. Prof. Bombini indicates three conditions: I. Spherohedric crystallisation; II. Polyhedral crystallisation; and III. Pseudocubic, &c., crystallisation. The third may be considered intermediate between the first and the second; the first appearing as a term of transition between the sphericity of the liquid state and the polyhedry of physical solidity.

#### GEOGRAPHICAL NOTES

THE February *Proceedings* of the Geographical Society opens with Capt. Holdich's paper on the "Geographical Results of the Afghan Expedition"; but of more importance from a geographical point of view are Mr. Wilfred Powell's "Observations on New Britain and Neighbouring Islands." The latter is accompanied by a sketch-survey of the north-east portion of New Britain by the author, which of itself is of considerable value. A correspondence between Admiral Ryder, Naval Commander-in-Chief at Portsmouth, and the Council of the Society follows, by which we learn that the latter, in declining his offer to establish certain medals, are of opinion that "the plan of granting medals to officers and seamen for independent surveys is impracticable," and further that they do not consider it their business to take any action in regard to an international congress of hydrographers.

UNDER the title of "Union Géographique du Nord de la France," a geographical association was formed some time ago, with its head-quarters at Douai, and branches at Amiens, Arras, Boulogne, Cambrai, Charleville, Dunkerque, Laon, Lille, St. Omer, St. Quentin, and Valenciennes. In the first part of the *Bulletin* of the Union, which has been sent to us, the list of members covers about fifty pages. The object of the association is by every means to promote the development and spread of geographical knowledge, investigating specially questions relating to the industry, commerce, and agriculture of the region of the Nord. The *Bulletin*, a volume of some size, contains papers on the Exploration of the Sahara, Nordenkjöld's last voyage, a Project for Exploring the Wellé, the Proposed Canal between the Atlantic and the Mediterranean, and the Maritime and Commercial Statistics of Dunkerque. In the *Comptes rendus* of the meetings of the various societies are abstracts of papers on a great variety of subjects, and there are besides a geographical chronicle and a pretty full bibliography. We have no doubt the Association will do much good in the North of France.

PROF. UJFALVY has left St. Petersburg on his return from Central Asia. The journey he made during last summer was not so successful as his preceding travels, because of a serious

illness which kept the traveller in his bed for more than two months. Nevertheless the ethnographical collections brought in are very interesting.

THE Smolensky *Vestnik* gives the following information as to Colonel Prijevalsky. He was born on April 12, 1839, at the village of Otradnoye, in the Smolensk district. His mother and his old nurse, both still alive, were the first who inspired him with a warm love of nature, and his life, on the estate of his mother, contributed to the development of this love. He studied at the Smolensk College (gymnasium), and notwithstanding the desire of his mother, who wished him to enter a university, he entered as a sub-officer in the Polotsk infantry regiment. Promoted to the grade of officer, he went to the military academy, and soon we find him as an officer during the Polish campaign, and afterwards as a teacher of geography and history in the cadet school at Warsaw. A keen hunter, he could not stay long in a city, and he soon undertook a journey to the Oussouri. This determined his ultimate career; the richness of the fauna and the pleasure of hunting in uncivilised countries determined him to undertake further journeys, first to Southern Mongolia, then to Lob-nor, and finally to Tibet, which he reached last year.

UNDER the title of "The Expiring Continent," Mr. A. W. Mitchell gives an account of his travels in Senegambia, mainly of journeys he made up the rivers Senegal and Gambia. The work contains no dates, thus detracting somewhat from its scientific value, and abounds with speculations and reflections on all sorts of subjects connected with Africa. His notes on what he saw during his journeys are of value as showing the recent condition of the country visited, and, as may be inferred from the title, the author's views are rather desponding. His inference from his observations on the small district visited by him, that the African continent as a whole is "expiring," is far too sweeping. While like the other continents it contains "desert places," the bulk of it, so far as we know it, is capable of the greatest industrial development. That its waters are drying up as a whole there is no reason for believing; but evidently in this and in other respects there is ample room for trustworthy scientific examination. The publishers are Allen and Co.

THE February number of *Petermann's Mittheilungen* begins with a paper on the Chukchis on the shores of the Arctic Ocean, their number and present position, based on two articles by O. Nordqvist and Lieut. Hovgaard. Dr. Gustav Radde contributes the first part of a narrative of his journey to Talgsch, Aderbeijan, and Sawalan in 1879-80. From the papers in the *North American Review* a long account is given of M. Désiré Charnay's explorations of the ruins in Central America. There is an elaborate and detailed map, with accompanying text, illustrating Dr. Junker's journey through the valley of the Chor Baraka, in the Egyptian province Taka in 1876.

MESSRS. W. AND A. K. JOHNSTON have sent us the first two parts of a "Statistical Atlas of England, Scotland, and Ireland," by Mr. G. Phillips Bevan. These two parts include Religious and Educational Statistic, and subsequent parts will be devoted to Industry, Crime, Marine, Agricultural, Railways, Geology, and Mining, &c.; there will be fifteen parts in all. In the first two parts a vast amount of useful statistics are graphically exhibited on the maps, and systematically arranged in separate tables. Much of the information thus exhibited could not be obtained from any other single source.

No. 90, the concluding part of the fifteenth volume of the *Zeitschrift* of the Berlin Geographical Society, contains the conclusion of the late Dr. Erwin von Bay's interesting journal of his journey from Tripoli to Ghât and Air, and a paper on the region which caused the recent contest between Chili and Bolivia, by Dr. C. Marten. The rest of the number, 130 pages, is occupied with the bibliography of the past year, one of the most valuable features of this most important of geographical journals. The bibliography is practically exhaustive, is arranged in a thoroughly systematic manner, and includes works relating to all departments of geography.

M. SIBIRIAKOFF has safely returned to St. Petersburg, where he had a brilliant reception. At a meeting of the Society for the Furtherance of Russian Commercial Navigation, M. Sibiriakoff pointed out the grave errors contained in Russian marine charts, which caused two of his captains to mistake the Gydan Bay for the Yenisei Estuary. They entered it on September 12, and soon met with thick-packed ice. The *Nordland* had stopped at once, the *Oskar Dickson* proceeding some 100 versts further to the

south. Thence the travellers had journeyed to Obdorsk, with Samogedes as guides.

THE Rüppell fund at Frankfort-on-the-Main, which was founded in honour of the Nestor of African travellers, Dr. Eduard Rüppell, and for the exclusive object of supporting scientific exploration, consisted of the sum of 35,570 marks (1770*l.*) at the end of last year. From this the Senkenberg Naturforschende Gesellschaft, at their last meeting, granted the sum of 3000 marks (150*l.*) to Dr. Wilhelm Kobelt of Schwaneheim, an eminent conchologist. Dr. Kobelt is now engaged upon the investigation of the existing and fossil molluscan fauna of the Mediterranean, and had during the last few years repeatedly visited Italy and Sicily for this purpose. His next tour, which is to extend from March to September, will comprise Spain, Algeria, and, if possible, Morocco. We may remind our readers that the journeys of Drs. Noll and Grenacher to Spain and the Canary Islands in 1871, as well as those of Verkrüzen to Newfoundland in 1874 and 1875, were also largely supported by grants from the Rüppell fund.

GEODETICAL measurements will be begun next spring on the stretch between Great St. Bernard and the St. Gotthard for connecting together the Italian and the Swiss geodetical network.

A NEW expedition will start, next spring, for the exploration of the Obi, under the direction of M. Moiséeff. Six pupils of the Marine School of Arkhangelsk will accompany him.

THERE is some talk of uniting the three geographical societies of Switzerland, those of Berne, Geneva, and St. Gall, as well as those which may be created afterwards, into one great Swiss geographical association, which will have a central committee and an annual general assembly devoted to the study of geographical questions, and especially of those which have a commercial interest.

UNDER the title of "Das Frauenleben der Erde," illustrated by A. von Schweiger-Lerchenfeld, A. Hartleben of Vienna has published a highly interesting description of the social life of the women of all nations. The work contains much that is of ethnographical value, and the numerous well-executed illustrations, as well as the attractive style of the text, are likely to render it of popular interest.

THE Austrian Section of the German and Austrian Alpine Society held its annual meeting at Vienna, on January 26 last. The Section now numbers 1302 members.

ON January 29 a branch of the Berlin "Centralverein" for commercial geography was formed at Düsseldorf. The new branch is directing its main attention to South Africa.

IN the place of the late Dr. Mook, Dr. Manthey has joined the Kiebeck expedition, which will leave Cairo in the course of a few days, and will, first of all, proceed to Socotra by way of Aden.

#### *ABNORMAL VARIATIONS OF BAROMETRIC PRESSURE IN THE TROPICS AND THEIR RELATIONS TO SUN-SPOTS, RAINFALL, AND FAMINES*

M. R. F. CHAMBERS, in his valuable and highly interesting article (vol. xxiii. p. 88) under the above title, has made an important step towards placing the relation between secular weather changes and sun-spots on a more substantial basis than it has hitherto occupied. This has been mainly effected by his employing the most reliable data we at present possess of the latter phenomena, thereby bringing the salient features of their *minor* variations for the first time into direct comparison with a definite meteorological element, which, it may be remarked, possesses the distinct advantage of representing the integrated effect of changes occurring throughout the entire atmospheric envelope.

He has also shown how the remarkable lag which takes place in the occurrence of the critical barometric epochs at the more easterly stations may be utilised to previses famines from a knowledge of what is going on at more westerly ones.

This however would only be practicable if we knew for certain that famines in all the districts mentioned, invariably took their rise from one set of conditions, such as failure of the usual summer rains, preceded and accompanied by high barometric pressure. In attributing the majority of the famines occurring within the tropics to such a proximate cause, Mr. Chambers